

REMARKS

Claims 1-16 are now pending in the present application. Claims 1-15 have been amended and claim 16 has been added. Claims 1 and 16 are independent. Reconsideration of this application, as amended, is respectfully requested.

Amendments to the Specification and Abstract of the Disclosure

The Specification, including the Abstract of the Disclosure, has been amended to place the application into better form for U.S. practice. Specifically, a Substitute Specification and a marked-up copy of the Substitute Specification have been provided for the Examiner's consideration. No new matter has been entered. Approval of and entry of the Substitute Specification are respectfully requested.

Amendments to the Drawings

Figure 2 has been amended to include cross-section designations in conformance with U.S. practice. Approval of the drawing amendment is respectfully requested.

Rejection Under 35 U.S.C. § 112

Claims 1-15 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This rejection is respectfully traversed.

As the Examiner will note, claims 1-15 have been carefully reviewed and revised, taking into consideration the specific deficiencies pointed out by the Examiner. Applicant respectfully submits that claims 1-15 are now definite and clear. Therefore, reconsideration and withdrawal of the Examiner's rejection under 35 U.S.C. § 112, second paragraph are respectfully requested.

Rejections Under 35 U.S.C. § 103

Claims 1-5 and 8-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Daiguji, U.S. Application Publication No. 2001/0039686 in view of Willes, GB 2,091,770 and Shigley & Mischke. Claims 12, 13 and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Daiguji, Willes and Shigley & Mischke, and further in view of Dufosse, U.S. Patent No. 3,967,421. Claims 6 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Daiguji, Willes and Shigley & Mischke, and further in view of Alznauer, U.S. Application Publication No. 2002/0121390. These rejections are respectfully traversed.

At the outset, it is respectfully pointed out to the Examiner that the Willes reference is not of record in the present application. It is requested that the Examiner list the Willes reference on a PTO-892 Form, so that the Willes reference will be printed on any patent resulting from the present application.

The present invention is directed to an end termination for a tension leg. Independent claim 1 is directed to an embodiment of the present invention and recites a combination of elements including the recitation "each of the strands being constructed of a plurality of rods of composite material having embedded strength fibers." Applicants respectfully submit that the combination of

references relied on by the Examiner fail to teach or suggest independent claim 1 of the present invention.

In particular, referring to the Daiguji reference, this reference discloses a bridge cable fixing structure. Referring to paragraphs [0027] and [0028] of Daiguji, the wires 4 are disclosed as being steel wires. Throughout the entire disclosure of Daiguji et al., the wires 4 are described as PC steel wires, which are “prestressed concrete” steel wires. Although the steel wires are described as being “PC” steel wires, the wires themselves are not made of prestressed concrete, but are made of steel. The reason that the steel wires are referred to as “PC” or “prestressed concrete” steel wires is that this type of wire is typically used in applications where the steel wires are embedded in concrete. Applicant submits that one having ordinary skill in the art would readily recognize that the steel wires are clearly made of steel and therefore the steel wires are not made of a composite material having embedded strength fibers as recited in independent claim 1 of the present invention.

Referring to the Examiner’s Office Action, the Examiner recognizes that Daiguji fails to disclose that the wires are made of a composite material having embedded strength fibers. However, the Examiner relies on the Willes reference to modify the Daiguji reference to arrive at the presently claimed invention. Applicant submits that the Examiner has not established a *prima facie* case of obviousness. In order to establish a *prima facie* case of obviousness, the Examiner must provide a teaching in the prior art of why it would be obvious to modify a particular reference in order to arrive at the presently claimed invention. Since the Examiner has not provided any teaching in the prior art other than the statement that it would be a matter of design choice, Applicants submit that the Examiner has not established a *prima facie* case of obviousness. In addition, the Examiner must

establish that there is a reasonable expectation of success in a particular modification. The Examiner is directed to MPEP § 2142, which sets forth the requirements of establishing a *prima facie* case of obviousness.

At pages 4-5 of the Examiner's Office Action, the Examiner indicates that it would be obvious to modify the Daiguji reference to use the material of Willes for the wires "because the combination of the high-modulus plastic fiber rope and end termination is able to withstand high tensile loading forces with lower weight." However, there is no indication that the "rope" of Willes would be sufficient as a wire in the cable fixing structure of Daiguji. Referring to Figure 1 of Daiguji, the cables 3 are used to support a bridge beam 11. Since there is no suggestion in the Willes reference that the "rope" could be used to support a bridge beam, Applicant submits that one having ordinary skill in the art would not be motivated to modify Daiguji in the manner suggested by the Examiner. In other words, the Examiner has not shown that there is any expectation of success of the modification proposed by the Examiner (see MPEP § 2143.02 entitled "Reasonable Expectation of Success is Required"). Applicant also submits that the use of the term "rope" in the Willes references supports the above position that the "rope" of Willes could not be used in the Daiguji bridge cable fixing structure.

When it comes to tension legs for an offshore platform as in the present invention, at some certain depth, it is not possible to use metal any further. Because of the weight of the metal, the tension legs are not able to withstand the tensile stresses within the tension leg and the metal eventually starts yielding and eventually ruptures. Thus, at a certain depth, it is necessary to use a lighter material. It has not been an easy selection between different materials.

The Applicants of the present invention needed a new product that would enable them to exploit natural resources located at deeper waters. The present invention goes one step further to be able to do this. To replace steel wires or rods with rods of composite material is not a straightforward task, but needs careful study, research and development in order to be able to use such materials in tension legs for platforms. The use of such materials creates new challenges due to the nature of such materials. A miscalculation or incomplete research could be fatal for personnel onboard such a platform.

As mentioned above, the Examiner primarily relies on the Daiguji reference, which relates to a load carrying bridge cable having bundles of stranded steel wires. Thus, the load carrying elements are clearly made of metal.

The fact that Daiguji discloses steel strands and not strands of composite material is significant. There is a difference in the behavior between strands of steel and strands of composite material, such as lightweight carbon rods.

The tension leg of the present application is concerned about the nature of carbon rods as strength elements within each strand. More recent development of such tension members has revealed that particular attention needs to be taken in order to avoid any significant shear stresses in the individual rods/strands. This application is in particular concerned with the end termination anchoring point. This has led to the study of how the individual strands behave when the radial restriction ceases, i.e. in the area of the embracing element 17. In the present specification, this aspect of the present invention is explained in detail and is termed "natural direction." When such "natural direction" is determined, the next step is to acknowledge and find the rotational orientation

of the receiving body 16 relative to the embracing element 17 taking into account the distance between them, in order to let each individual strand enter a dedicated aperture 8 in the receiving body 16 in the "natural direction." This is to avoid any significant transversal loads/sheer stresses in the strands constituting a bundle of rods.

In the Daiguji reference, the above problems of composite rods is not present, since load carrying elements of steel do not have significant problems with sheer stresses and therefore the solution outlined above is not relevant to the Daiguji reference. In view of this, one having ordinary skill in the art would not look to the Daiguji reference for a solution to the problems of composite rods as in the presently claimed invention.

With regard to dependent claims 2-13 and 15, Applicants respectfully submit that these claims are allowable due to their dependence upon allowable independent claim 1, as well as due to the additional recitations in these claims.

With regard to the Examiner's reliance on the Shigley & Mischke, Dufosse and Alznauer et al. references, these references also fail to disclose any sufficient motivation to modify Daiguji to use composite wires. Therefore, these references fail to make up for the deficiencies of Daiguji and Willes.

In view of the above amendments and remarks, Applicants respectfully submit that claims 1-13 and 15 clearly define the present invention over the references relied on by the Examiner. Reconsideration and withdrawal of the Examiner's rejections under 35 U.S.C. § 103 are therefore respectfully requested.

Allowable Subject Matter

Claim 14 has been indicated by the Examiner as being allowable if rewritten in independent form and to address the Examiner's rejection under 35 U.S.C. § 112, second paragraph. Applicants greatly appreciate the indication of allowable subject matter by the Examiner. Since claim 14 has been amended to address the Examiner's rejection under 35 U.S.C. § 112, second paragraph, it is believed that claim 14 is directed to subject matter that defines over the prior art. However, claim 14 has not been rewritten in independent form at this time, since it is believed that independent claim 1 is in condition for allowance for the above reasons. Applicant reserves the right to present claim 14 in independent form at a later date if it is so desired.

Additional Claim

Additional independent claim 16 has been added for the Examiner's consideration. Applicants respectfully submit that independent claim 16 is allowable for the same reasons mentioned above with regard to independent claim 1.

Favorable consideration and allowance of additional claim 1 is respectfully requested.

CONCLUSION

Since the remaining references cited by the Examiner have not been utilized to reject the claims, but merely to show the state-of- the-art, no further comments are deemed necessary with respect thereto.

All the stated grounds of rejection have been properly traversed and/or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently pending rejections and that they be withdrawn.


It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact Paul C. Lewis, Registration No. 43,368 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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By 
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PCL/cl
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Attachment(s)

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